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SUBJECT: TOYOTA SEES AN ALL HYBRID FUTURE

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11. (SBU) Summary: Toyota plans to more than double hybrid vehicle sales by 2010, apply hybrid technology across powertrain types, and integrate hybrid systems into long-term R&D programs to develop clean diesel, synthetic fuel, and hydrogen fuel cell vehicles, according to executives at a Toyota technical center. However, the same executives were not enthusiastic about the future of biofuels in Japan. While Toyota plans to commercialize a plug-in hybrid model by 2010, it must first solve battery capacity and weight issues. Hybrid vehicles get high marks for fuel efficiency and are an important element of GOJ strategy to reduce oil consumption and greenhouse gas emissions in the transport sector.

In the Future, Every Car Will be a Hybrid

12. (SBU) Toyota executives report the company expects annual sales of hybrid electric vehicles (HEVs) by 2010 to top one million vehicles worldwide -- a figure equal to Toyota's cumulative HEV sales in the ten years since the first Prius hybrid model was introduced. It is more than double estimated 2007 sales of 430,000. Toyota reports selling nearly eight million vehicles worldwide in 2006. In addition to new HEV models, Toyota plans to make a limited number of plug-in hybrid vehicles (PHEVs) available commercially through a special leasing program by 2010.

13. (U) Toyota officials emphasize hybrid systems can increase the efficiency of virtually any type of powertrain. While Toyota's current generation of HEVs runs on gasoline, the company expects to integrate hybrid systems into long-term R&D programs to develop clean diesel, synthetic fuel, and hydrogen fuel cell vehicles. In the meantime, however, Toyota expects to reduce the fuel consumption and emissions of its vehicles through hybrid technology and

incremental improvements to conventional gasoline and diesel engines.

As Toyota Goes, so Goes Japan . . . Except on Biofuels

14. (SBU) Toyota's technology strategy meshes closely with the GOJ's overall approach to reducing Japan's gasoline consumption and vehicle emissions. The plan developed by the Ministry of Economy, Trade, and Industry (METI) calls for concurrent research into alternative fuels, clean diesel, hybrid and electric battery technology, and hydrogen fuel cells with a near-term focus on applications for conventional engines. Although biofuels development is an important component of METI's plan, Toyota executives downplayed the role biofuels will play in displacing fossil fuels in Japan.

What is a Hybrid?

15. (U) The HEVs, such as Toyota's Prius, combine an electric motor and battery system with a traditional internal combustion engine. Surplus power from the engine and energy recovered from regenerative braking are captured and stored in the battery, which powers the electric motor during acceleration. A power control unit turns on and off the engine as necessary. The use of recovered energy makes HEVs more efficient than conventional vehicles. In studies by the Japan Automobile Research Institute (JARI), HEVs use roughly a third less fuel and produce half the carbon dioxide (CO2) emissions of conventional vehicles. Plug-in hybrid vehicles require even less fuel, as batteries can also be charged from a standard electric outlet, allowing the vehicle to run purely on electricity for a limited range before the battery needs recharging and the hybrid system turns the engine on.

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Of course, the ultimate emissions footprint of PHEVs depends on the source of electricity on the power grid.

Battery Technology Key for Plug-in Hybrids

16. (SBU) Toyota officials concede they must resolve battery storage capacity and weight issues for PHEV performance to be acceptable to the driving public. However, they say Toyota is making progress. Current test versions using nickel-metal hydride battery technology have an all-electric driving range of 10km and a maximum speed of 100km/hr. Battery charging takes 3-4 hours using a 100 Volt electric outlet. Toyota and other Japanese companies are investing in research on lithium-ion battery systems that promise greater storage densities, but executives acknowledge durability and safety issues remain. In a visit by ECONOFFs to battery manufacturer GS Yuasa in Nara Prefecture, company officials discussed a recent joint venture with Mitsubishi Corporation to develop high energy-density lithium-ion batteries for use in PHEVs by 2009.

SCHIEFFER